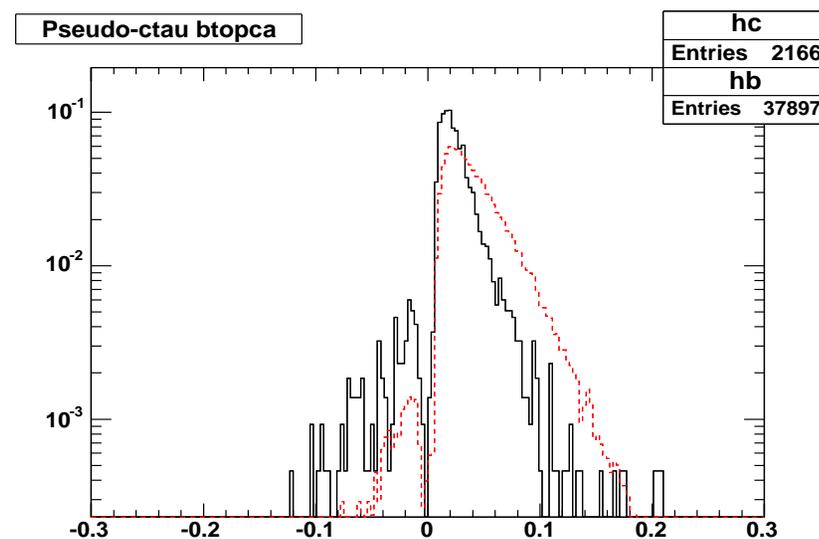
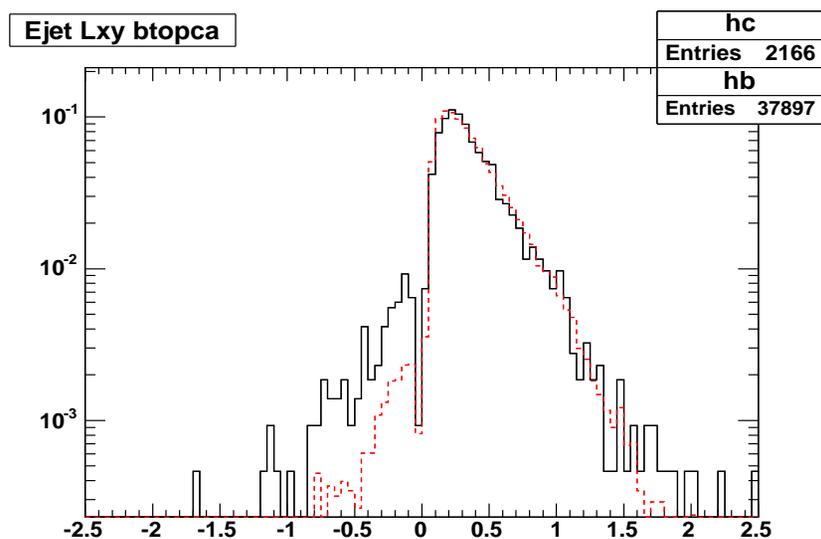
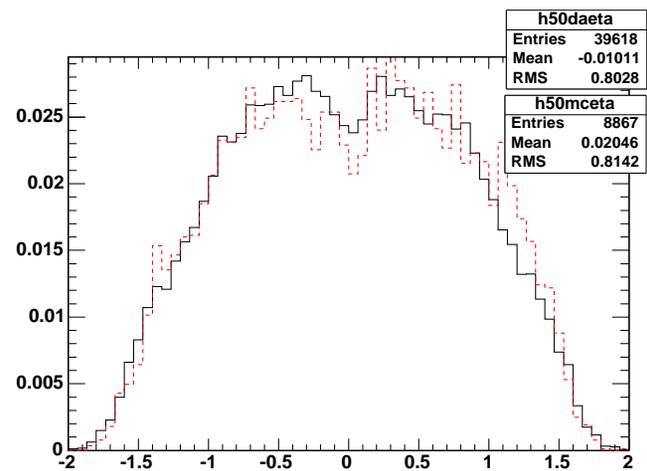
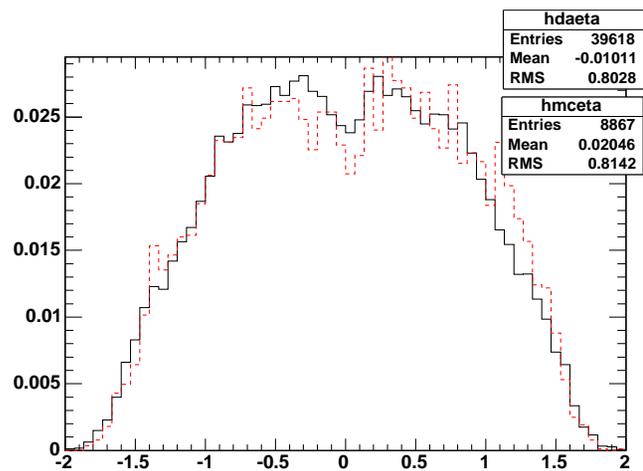
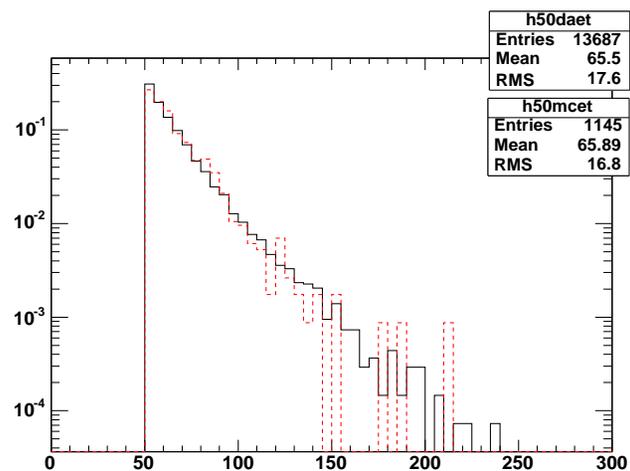
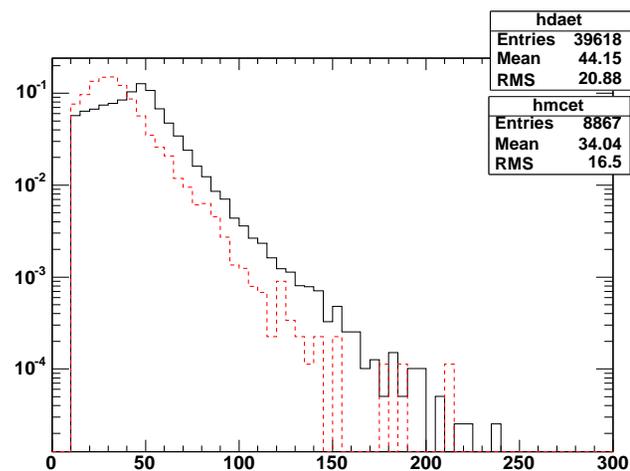


- First look at HF fractions in QCD events
- Why look in QCD events?
 - Run I:
 - people doubted the ability of the MC to simulate gluon splitting \Rightarrow calibrate gs using jet data (has gs and lots of stat)
 - Fit different distributions enriched and depleted of gs \Rightarrow $SF_{gs} = 1.4 \pm 0.2$ (applied to Herwig)
 - In CDF7007:
 - Verify the F_{HF} using jet data
 - Use pseudo- $c\tau$ fits
 - Found that F_{HF} is data is 1.5 larger than ALPGEN \Rightarrow K-factor $= 1.5 \pm 0.4$
 - Note: $SF_{gs} \neq$ K-factor
- Here: first look at F_{HF} from pseudo- $c\tau$ fits in Jet_50 & btopea (Pythia, dijet, $p_T^1 > 40$ GeV) and Jet_20 & btopda (Pythia, dijet, $p_T^1 > 18$ GeV)

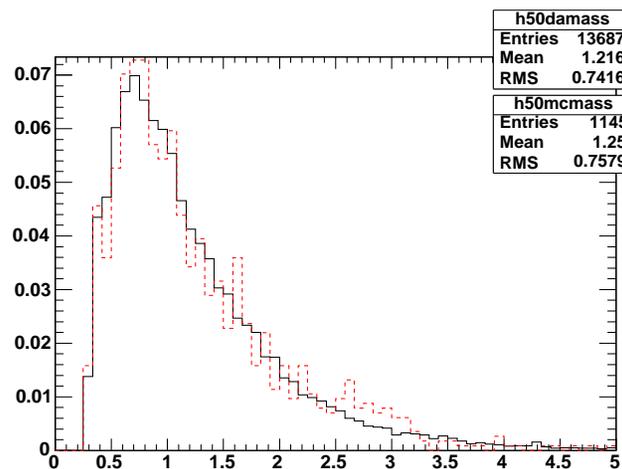
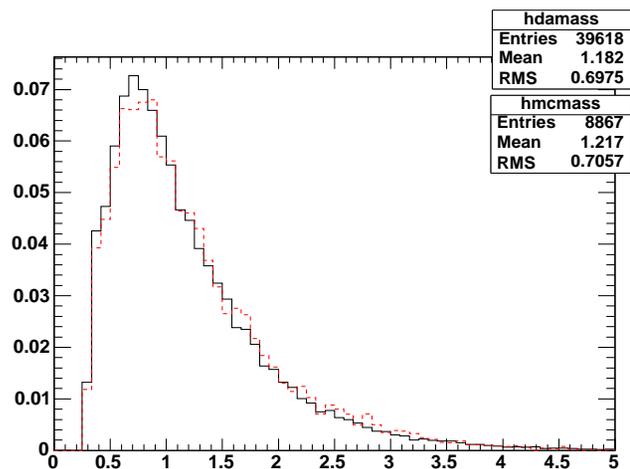
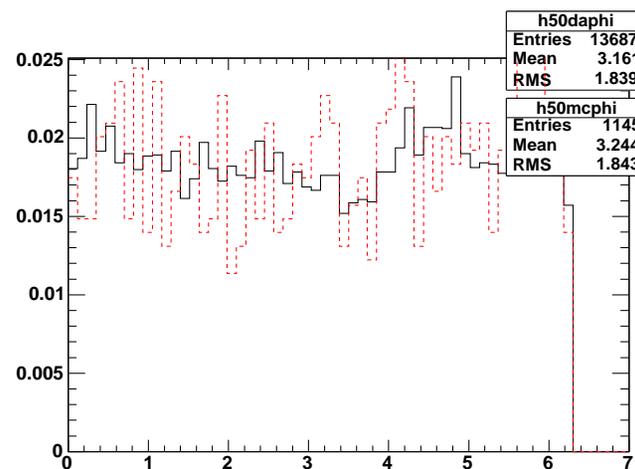
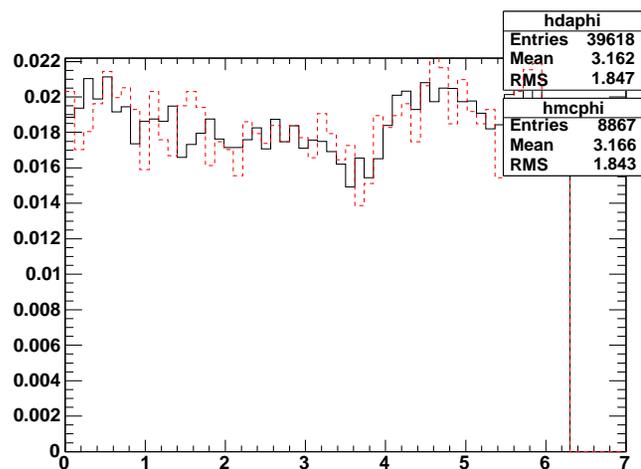
- Why Jet_20? Compare to cdf7007
- Why Jet_50? Jet_50 represents better b spectrum in top events (Fig 4.1 Fotios), check Et dependence, also more gs in Jet_50
- Why use pseudo- $c\tau$ to determine HF in data?
 $\text{pseudo-}c\tau = LxyM^{vtx}/p_T^{vtx}$ (cm) gives better separation between bs, cs and long-lived lf (K_s s, Λ s) than just vertex mass or Lxy.



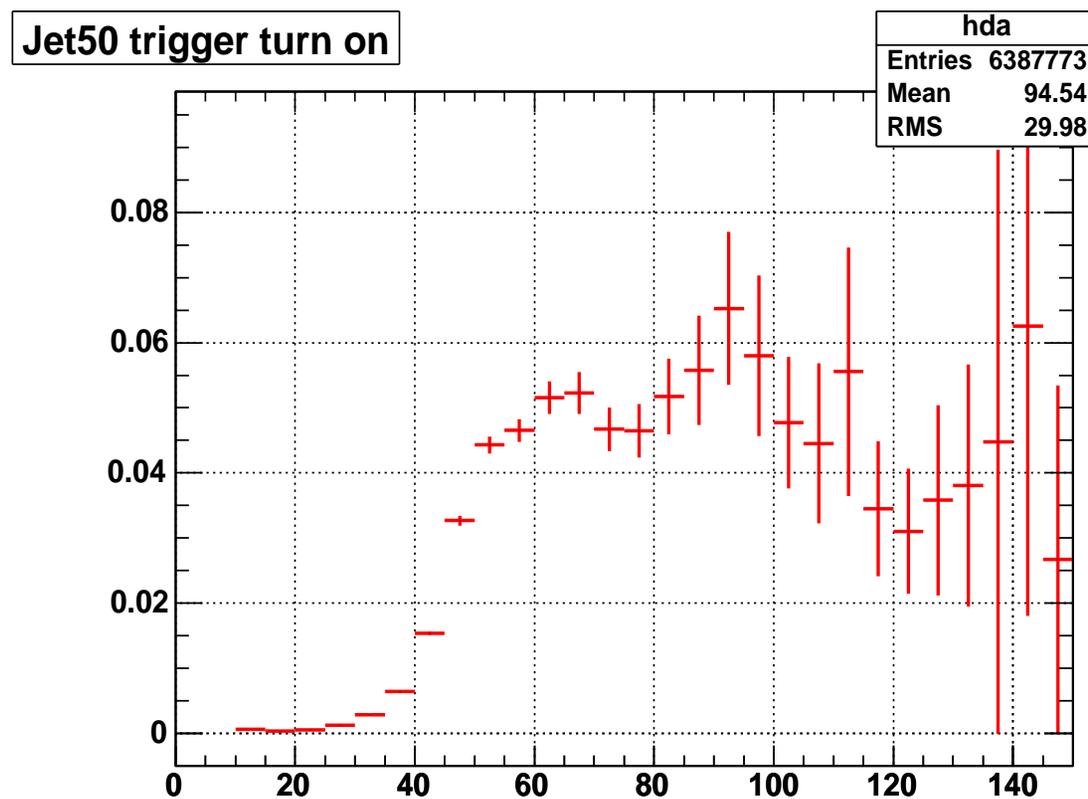
- Comparisons between data (jet50, black) and MC (btopea, red)
left: all Ets, right: only jets $> 50\text{GeV}$ - normalized



- Comparisons between data (jet50, black) and MC (btopea, red)
left: all Ets, right: only jets $> 50\text{GeV}$ - normalized

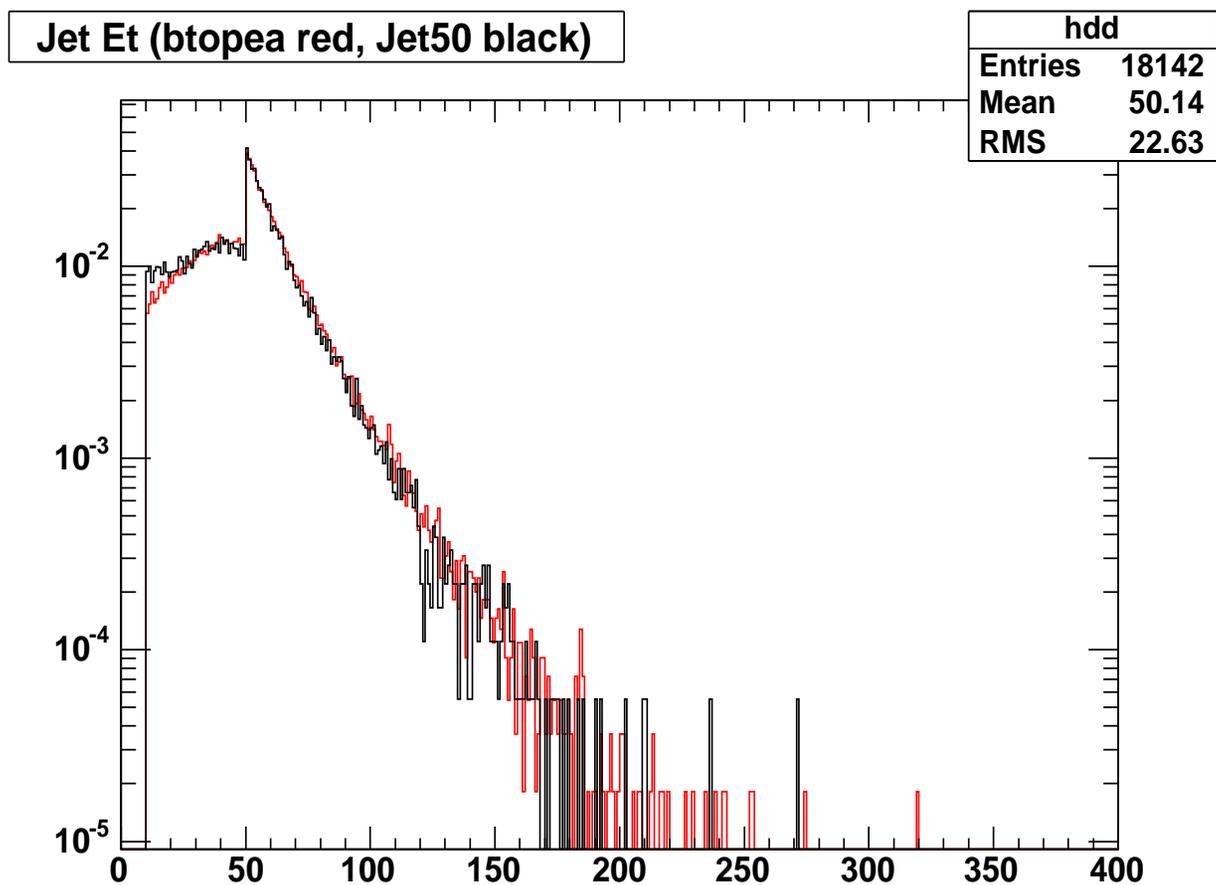


- Jet_50 Trigger turn on (Jet_20/Jet_50):

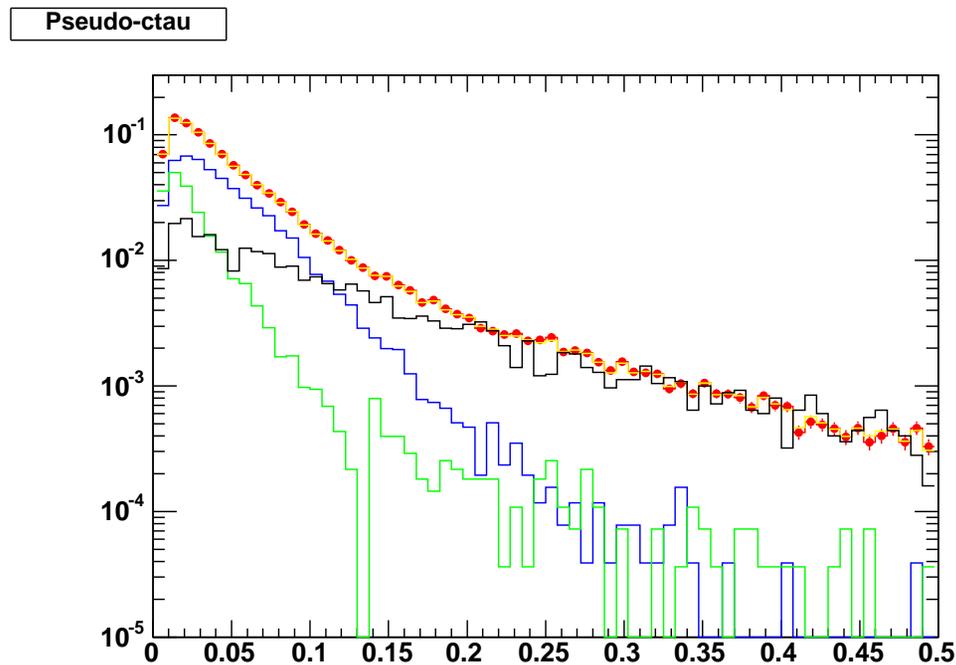


- Using 50 GeV for "trig simulation": require at least one jet > 50 GeV in event.

- Jet_50 (black) and btopea (red) Et spectrum after trigger requirement:



- Jet50 Loose pseudo-ctau fits (with trig req): fitted fractions of b, c and lf in pos tag excess (pos side of ctau–neg side).
- Using Daniel's cutetuples and code (with TFractionFitter - takes into account both data and Monte Carlo statistical uncertainties)
- $\chi^2/ndf = 1.5$, b: 52%, c: 21%, l: 27%



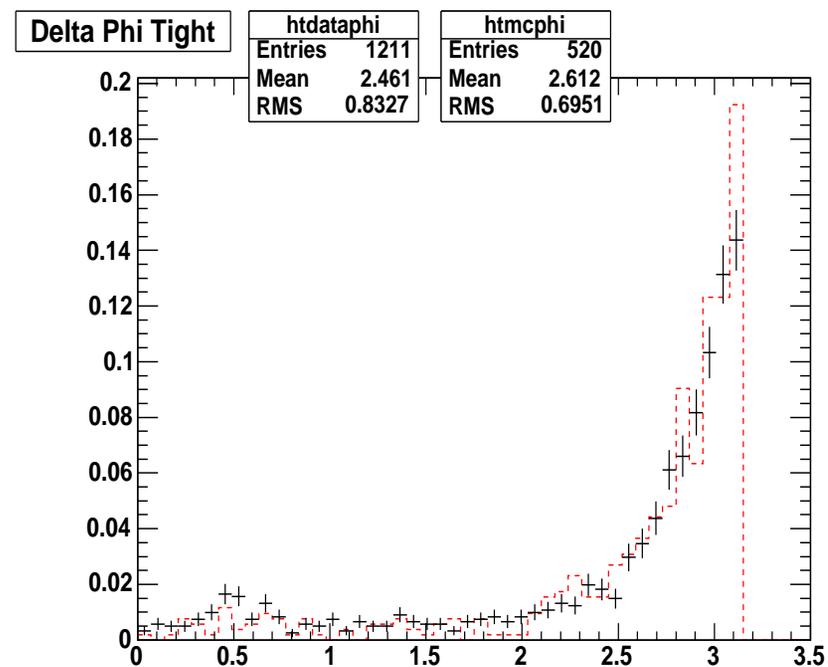
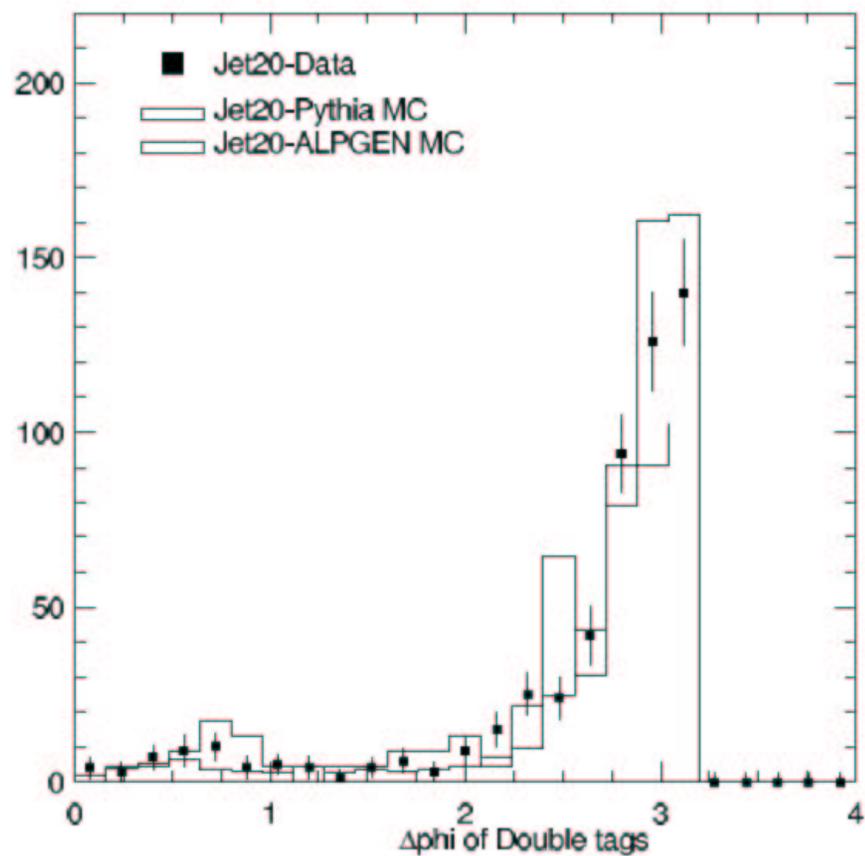
red: data, yellow: fit, blue: b, green: c, black: lf

- Comparisons with previous results:

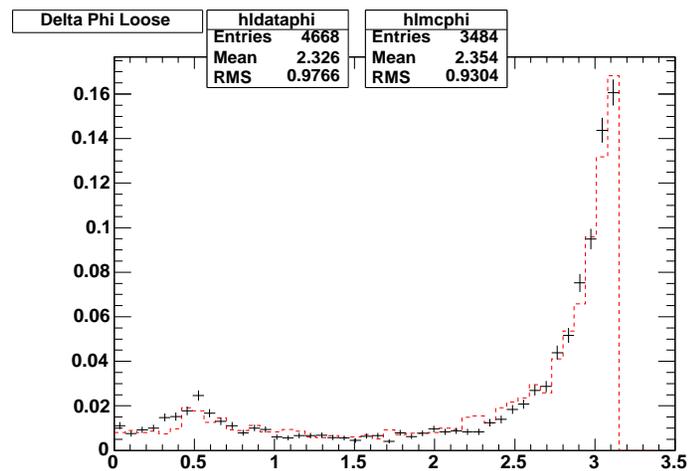
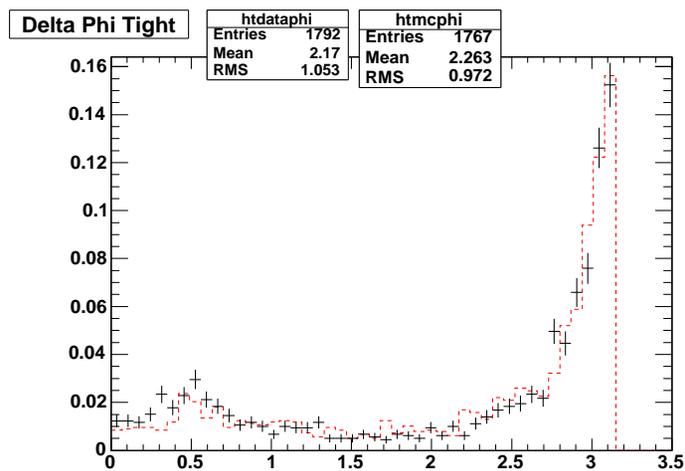
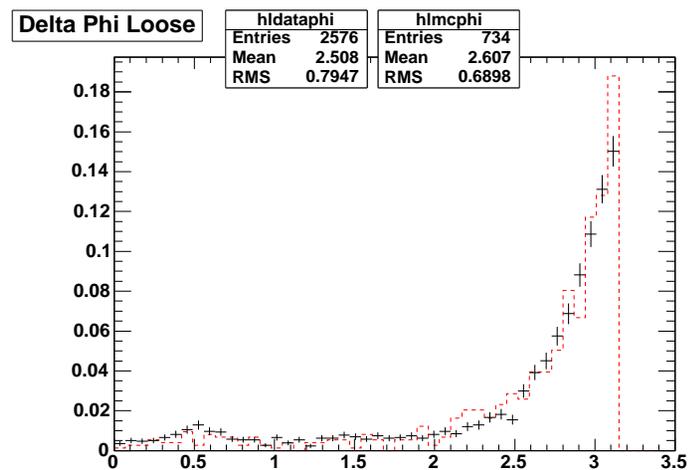
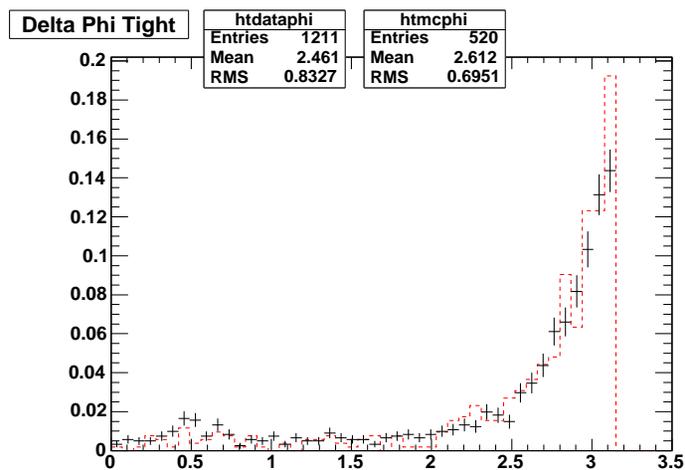
	CDF7007	This	CDF7585	This
	Jet20	Jet20	Jet50	Jet50
	Tight	Tight	Loose	Loose
Data Excess	23446	51591	193237	140326
Fitted b's	15147	34101	96451	73236
Fitted c's	5589	10215	47877	29497
Fitted light	2836	7222	48908	37579
b fraction (%)	64.4	66.1	49.9	52.2
c fraction (%)	23.8	19.9	24.7	21.0
χ^2/ndf	?	2.2	1.71	1.5

- Have more data to run on, but MC is limited at high (ctau) bins - need to implement variable binning..

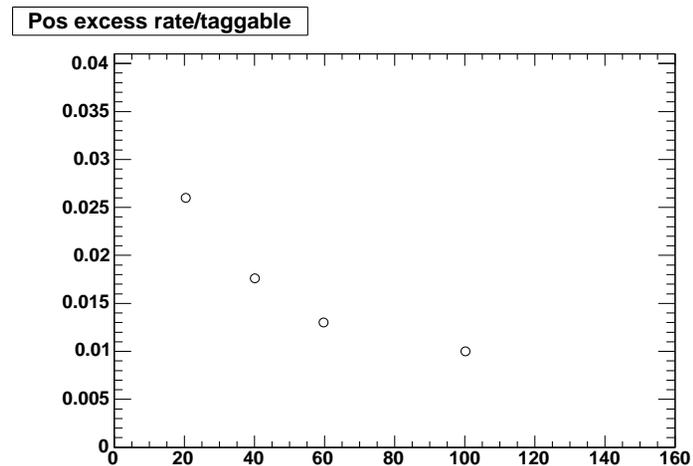
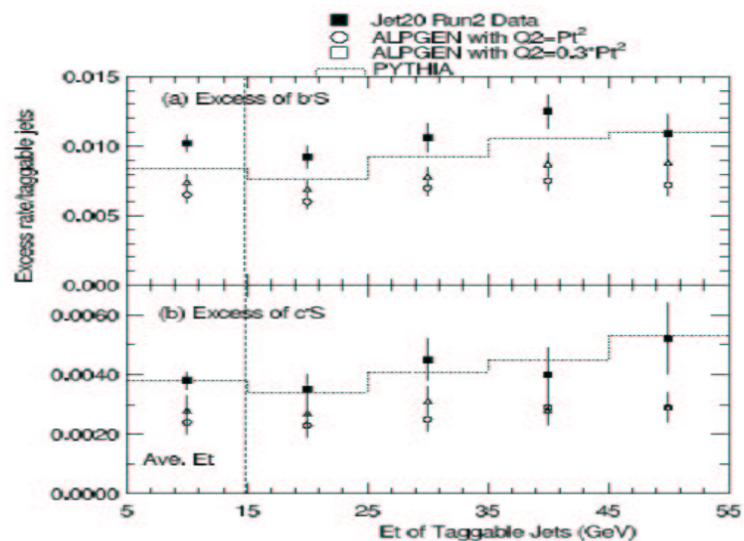
- More comparisons...
- Delta phi between tagged jets in double-tags (MC red, data black)
- Fig 13 cdf7007 and Jet20 tight (this)



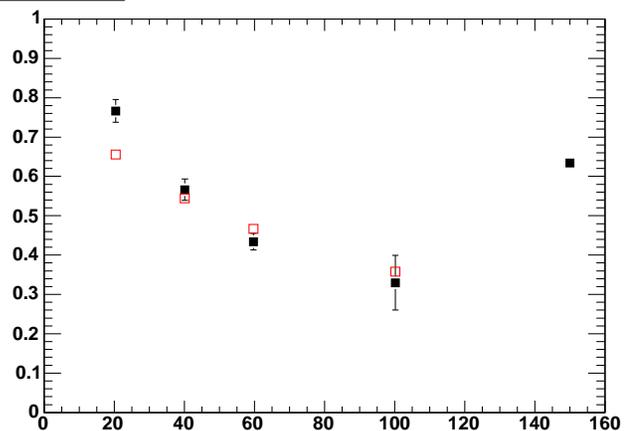
- jet20 tight jet20 loose
- jet50 tight jet50 loose



- $(\text{Pos excess of HF jets})/(\text{taggable jets})$



$b/(b+c+l)$ vs ET

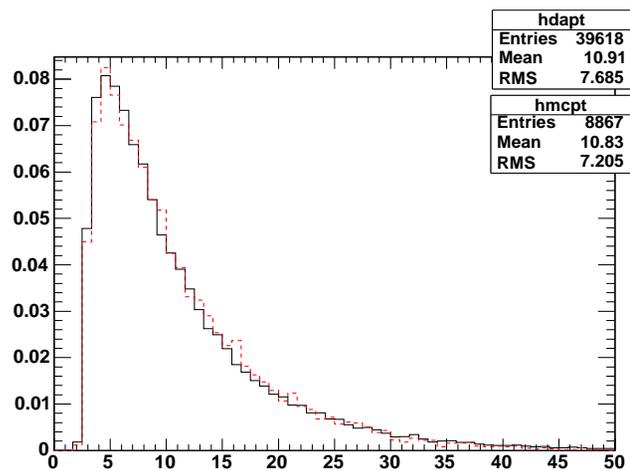
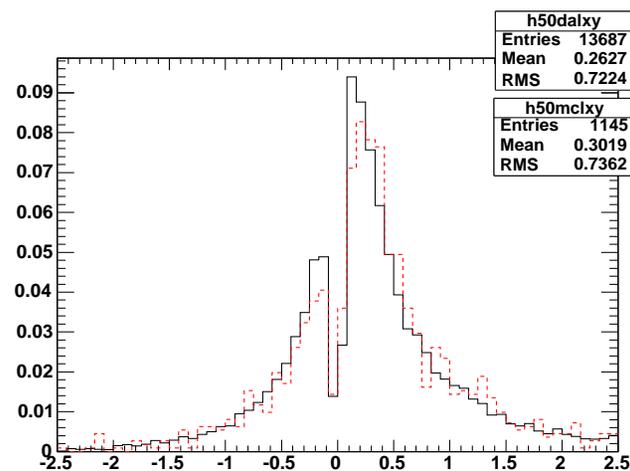
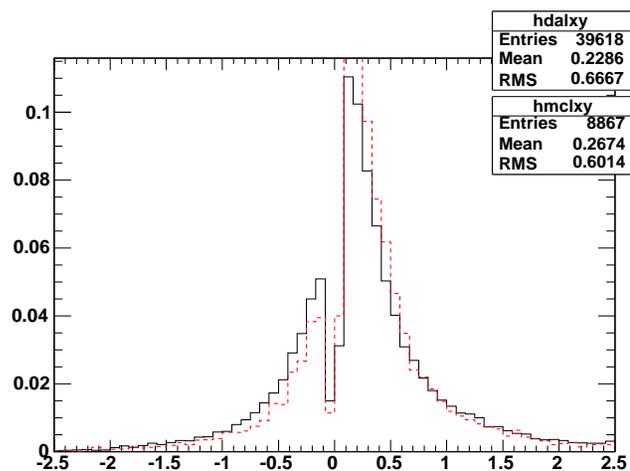


b -fractions (last bin is cdf7585)

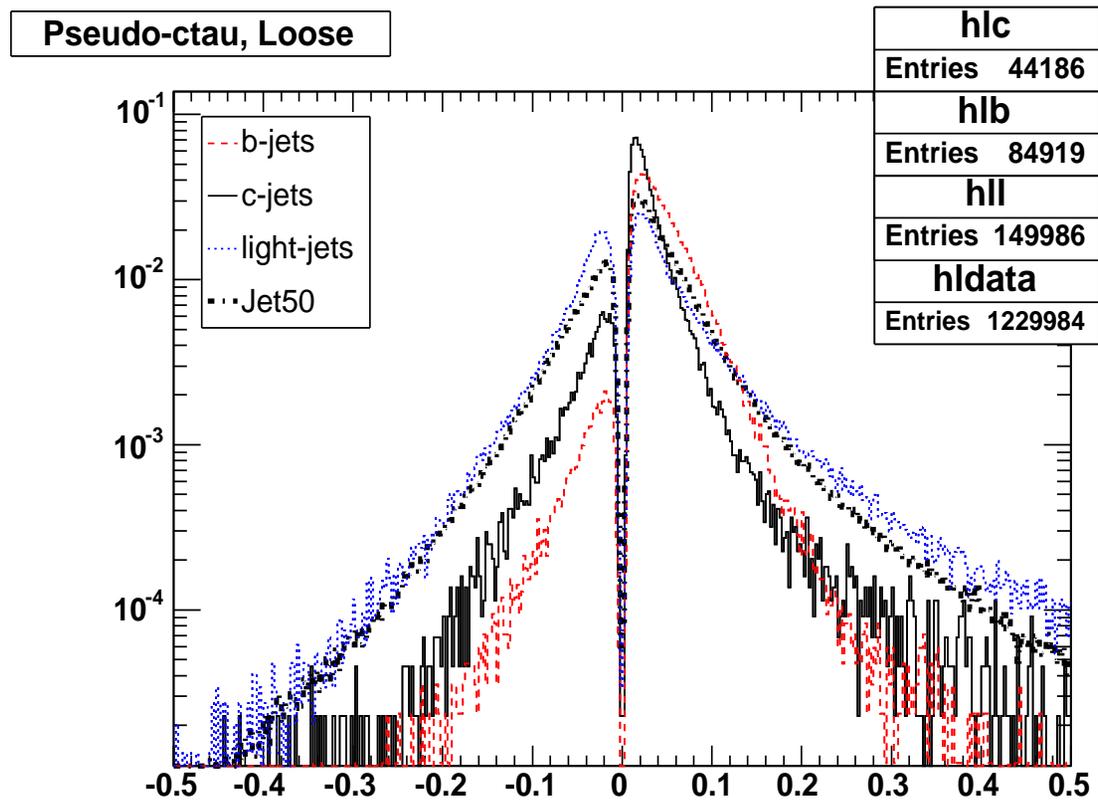
To do:

- Et dependence of tag rate?
- Look at run I distributions, is there no gs effect?
- Add hepg info...

- Comparisons between data (jet50, black) and MC (btopea, red)
left: all Ets, right: only jets $> 50\text{GeV}$ - normalized



- pseudo-ctau templates (btopea):



- pseudo-ctau fits, no extra trigger requirement
 - $\chi^2/ndf = 1.9$, b: 51%, c: 21%, l: 28%
- Data excess rate/taggable b: 0.0146 ± 0.0002
- MC excess rate/taggable b: 0.0146 ± 0.0001

